

PS-P7X

US Model
AEP Model
UK Model



STEREO TURNTABLE SYSTEM

SPECIFICATIONS

GENERAL

Power Requirements:	120 V ac, 60 Hz (US model) 110, 120, 220, or 240 V ac ~ adjustable, 50/60 Hz (AEP, UK model)
Power Consumption:	12 W
Dimensions:	Approx. 430(w) x 110(h) x 350(d) mm 17(w) x 4 ³ / ₈ (h) x 13 ⁷ / ₈ (d) inches including projecting parts and controls
Weight:	Approx. 10 kg, 22 lb 1 oz (net) Approx. 11.3 kg, 24 lb 15 oz (in shipping carton)

TURNTABLE

Platter:	31 cm, 12 ¹ / ₄ inches, aluminum-alloy diecast
Motor:	Linear BSL (brushless and slotless) motor
Drive System:	Direct drive, crystal-lock control system
Speed:	33 ¹ / ₃ rpm, 45 rpm
Starting Characteristics:	Comes to nominal speed within a ¹ / ₅ revolution (33 ¹ / ₃ rpm)

Wow and Flutter:	±0.04% (DIN) 0.025% (WRMS)
Signal-to-noise Ratio:	75 dB (DIN-B)
Load Characteristics:	0% at 150 g tracking force
Automatic System:	Return, reject

TONEARM

Type:	Statically balanced, universal
Pivot-to-stylus Length:	216.5 mm, 8 ¹ / ₂ inches
Overall Arm Length:	300 mm, 11 ⁷ / ₈ inches
Overhang:	16.5 mm, ²¹ / ₃₂ inches
Tracking Error:	+3°, -1°
Tracking-force Adjustment Range:	0 - 3 g
Headshell Weight:	11 g
Cartridge Weight Range: (including headshell weight)	12 - 18.5 g 18 - 24.5 g (with extra weight)

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY SHADING AND MARK
▲ ON THE SCHEMATIC DIAGRAMS, EXPLODED
VIEWS AND IN THE PARTS LIST ARE CRITICAL TO
SAFE OPERATION. REPLACE THESE COMPONENTS
WITH SONY PARTS WHOSE PART NUMBERS APPEAR
AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS
PUBLISHED BY SONY.

- Continued on page 2 -

SONY®

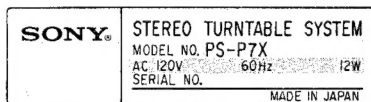
SERVICE MANUAL

CARTRIDGE XL-15 (AEP, UK model)

Type: Moving magnet type
Frequency Response: 10 Hz — 30 kHz
Channel Separation: 25 dB at 1 kHz
Output Voltage: 4 mV at 1 kHz, 5 cm/s
Load Impedance: 50 k Ω
Tracking Force: 1.2 — 2.5 g (1.7 g recommended)
Stylus: Sony ND-15G
Weight: 5.2 g

MODEL IDENTIFICATION

— Specification Label —

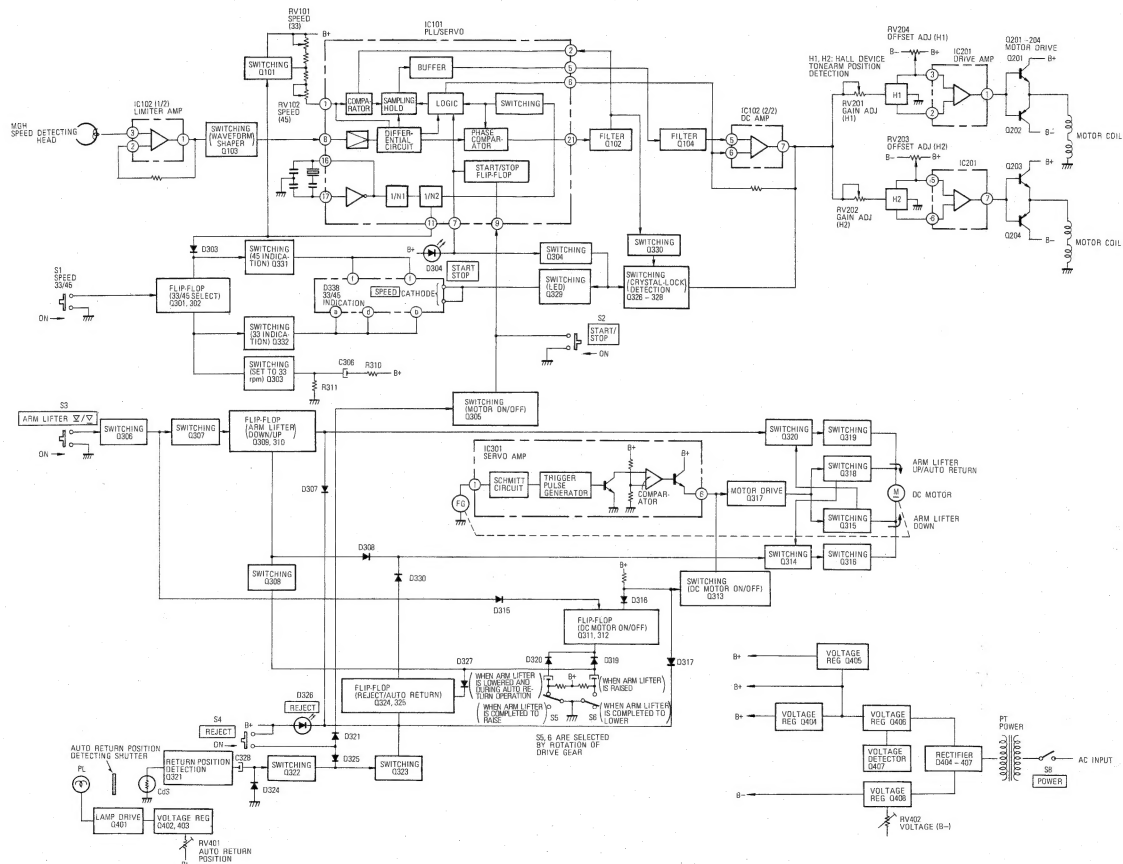


AC 120 V 60 Hz 12 W. US model

AC 110, 120, 220, 240 V ~ 50/60 Hz 12 W. AEP, UK model

SECTION 1 OUTLINE

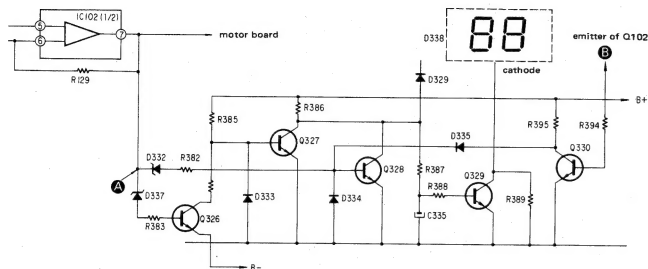
1.1. BLOCK DIAGRAM



1-2. CIRCUIT DESCRIPTION

CRYSTAL-LOCK DETECTION CIRCUIT

When the turntable has reached its designated speed this circuit indicates that the crystal-lock circuit is operating by increasing the brightness of the LED which indicates speed.



Voltage at point A

STOP mode: 0 V
At the moment the unit starts playing: 10 V
When the unit is playing stably: -1 V to 2 V
At the moment the unit stops: -10 V
At the moment turntable speed is changed from 33 rpm to 45 rpm: 10 V
At the moment turntable speed is changed from 45 rpm to 33 rpm: -10 V

Voltage at point B

STOP mode: 0 V
When STOP switch is depressed: 0 V
At the moment turntable speed is changed from 45 rpm to 33 rpm: 0 V
At other times: more than 1 V

OPERATION

When the voltage at point A exceeds 8 V, D332 and Q328 turn ON. This turns Q329 OFF and the cathode of D338, an LED, is grounded through R389 and D338 grows dim. When the voltage at point A falls to less than -8 V, D337 and Q326 turn OFF, and Q330 turns ON. This turns Q329 OFF and the cathode of D338 is grounded through R389 and D338 grows dim. In short, when the voltage at point A is anywhere from -8 V to 8 V, Q329 turns ON, causing D338 to brighten.

However, when the voltage at point A is zero, the voltage is detected at point B so that D338 is not brightly lit. When the voltage at point B is zero, Q330 turns OFF and Q328 turns ON. This turns Q329 OFF and D338 grows dim.

AUTOMATIC RETURN OPERATION

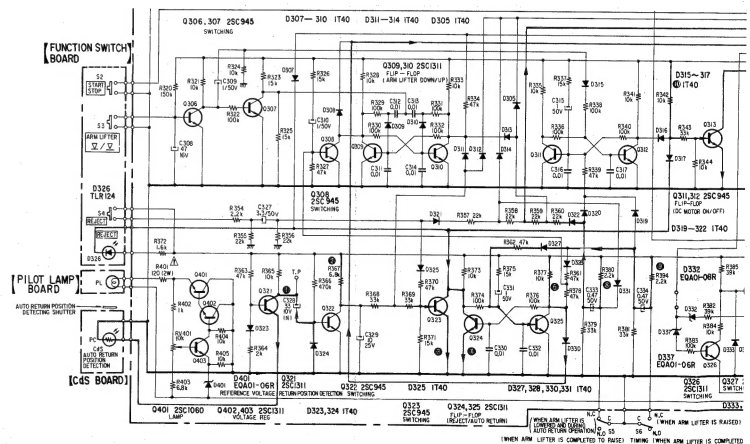
When the tonearm enters the lead-out groove, the auto return position detecting shutter opens. The resistance value (CdS) of Q321 emitter decreases and C328 is discharged (See current ①). This turns Q322 OFF and the trigger pulse of the current ② turns Q323 ON. (Also when REJECT switch (S4) is depressed, Q323 turns ON.)

On the other hand, the current passing through R375 and C331 holds Q324 OFF and Q325 ON as flip-flop, when POWER switch (S8) turns ON. But

when Q323 turns ON for a moment, the flip-flop is reversed. That is to say, Q324 is turned ON and Q325 OFF. (See currents ③ and ④). The REJECT indicating LED is lit by current ④.

Another flip-flop, Q311 and Q312, is held ON and OFF by the current passing through R337 and C315 when POWER switch (S8) is turned ON. As a result, current ① turns Q313 ON and the output of IC 301 (terminal ⑤) is grounded. However, when Q324 turns ON Q313 is turned OFF so that the

output of Q313 is turned ON and Q318 is turned ON as soon as the switch is turned ON. The flip-flop is driven by



AUTOMATIC RETURN OPERATION

When the tonearm enters the lead-out groove, the auto return position detecting shutter opens. The resistance value (CdS) of Q321 emitter decreases and C328 is discharged (See current ①). This turns Q322 OFF and the trigger pulse of the current ② turns Q323 ON. (Also when REJECT switch (S4) is depressed, Q323 turns ON.)

On the other hand, the current passing through R375 and C331 holds Q324 OFF and Q325 ON as flip-flop, when POWER switch (S8) turns ON. But

when Q323 turns ON for a moment, the flip-flop is reversed. That is to say, Q324 is turned ON and Q325 OFF. (See currents ③ and ④). The REJECT indicating LED is lit by current ⑤.

Another flip-flop, Q311 and Q312, is held ON and OFF by the current passing through R337 and C315 when POWER switch (S8) is turned ON. As a result, current ⑥ turns Q313 ON and the output of IC 301 (terminal ⑥) is grounded. However, when Q324 turns ON Q313 is turned OFF so that the

output of IC 301 (current ⑦) is applied to the base of Q317. When Q325 turns OFF, Q314, Q316 and Q318 are turned ON by current ⑧. Current ⑦ flows and the DC motor starts rotating. The drive gear turns clockwise so that the arm lifter raises. As soon as the arm lifter is completely raised, timing switch (S5) switches from N.C. to N.O. Current ⑧ turns Q305 ON so that the START/STOP flip-flop is reversed and the turntable stops rotating. The drive gear is kept rotating by current ⑦ and the

tonearm starts the return operation. When the tonearm reaches its rest, timing switch (S6) switches from N.C. to N.O. Current ⑨ turns Q325 ON and Q324 OFF interrupting current ① turning off the REJECT indicating LED.

Q313 turns ON by current ⑥ and the output of IC301 (terminal ⑥) is grounded. Since currents ⑥ and ⑦ do not flow, DC motor stops rotating.

of Q102

B+

Q332

the

Q389

OFF.

the

and

point

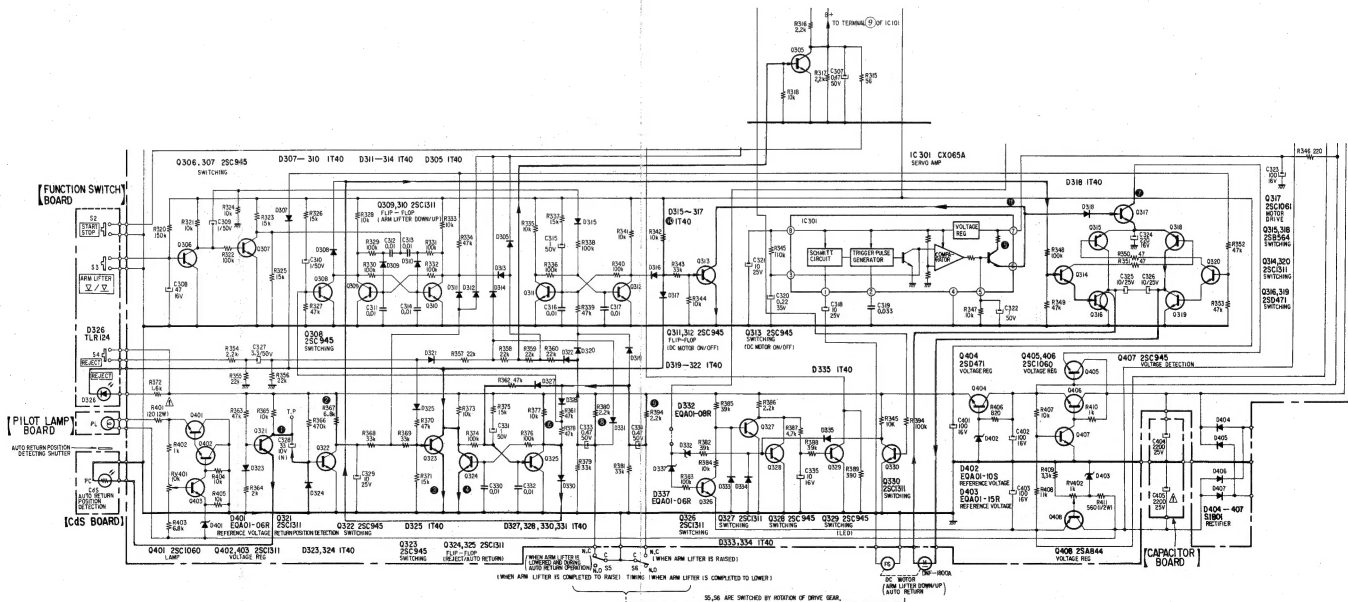
ON,

zero,

38 is

③ is

This



TI

As soon as the drive gear reaches the position where the arm lifter is completely raised, timing switch (S5) switches from N.C. to N.O. The flip-flop is reversed by current ⑧', that is to say, Q311 turns ON and Q312 OFF. Current ⑨ turns

The flip-flop, Q309 and Q310 is reversed every time current **⑤** flows or not flows. When POWER

When ARM LIFTER switch (S3) is depressed again, Q317 turns ON reversing the flip-flop, Q309 and Q310. That is to say, Q310 turns OFF and Q309 turns ON. Current ⑥ turns Q320, Q319 and Q315 ON so that current ⑦ flows. The DC motor starts rotating and the drive gear turns counter-clockwise so that the arm lifter starts lowering. As soon as the drive gear reaches the position where the arm lifter is completely lowered, timing switch (S6) switches

from N.C. to N.O. The flip-flop is reversed by current ⑧ that is to say, Q311 turns ON and Q312 turns OFF. Current ⑨ turns Q313 ON and the output of IC 301 (terminal ⑥) is grounded. As a result, Q317 turns OFF, interrupting current ⑦ and the DC motor stops rotating.



SECTION 2

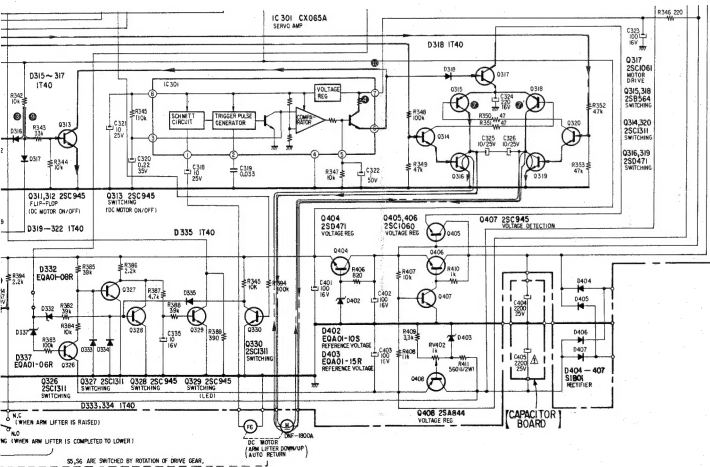
DISASSEMBLY

Q313 ON and the output of IC 301 (terminal ⑥) is grounded. As a result, Q317 turns OFF interrupting current ⑦ and the DC motor stops rotating.

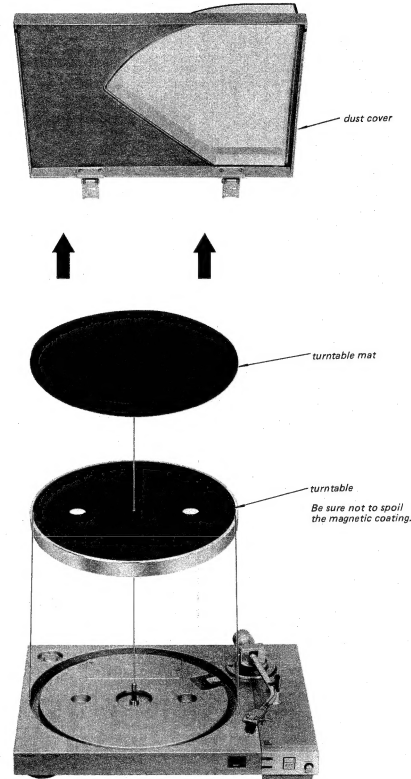
Tonearm Lowering Operation

When ARM LIFTER switch (S3) is depressed again, Q317 turns ON reversing the flip-flop, Q309 and Q310. That is to say, Q310 turns OFF and Q309 turns ON. Current 6 turns Q320, Q319 and Q315 ON so that current 7 flows. The DC motor starts rotating and the drive gear turns counterclockwise so that the arm lifter starts lowering. As soon as the drive gear reaches the position where the arm lifter is completely lowered, timing switch (S6) switches

from N.C. to N.O. The flip-flop is reversed by current ⑧ that is to say, Q311 turns ON and Q312 turns OFF. Current ⑨ turns Q313 ON and the output of IC 301 (terminal ⑥) is grounded. As a result, Q317 turns OFF, interrupting current ⑦ and the DC motor stops rotating.

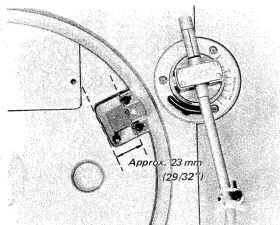


TURNTABLE REMOVAL



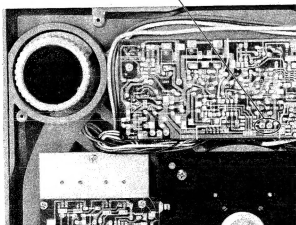
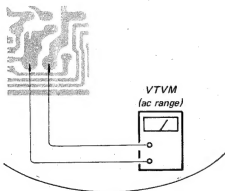
Speed-Detecting Head Output Adjustment

Adjust the position of the speed-detecting head so that the VTVM reading is 25 – 50 mV ac at 33 rpm.



Note: Be sure not to spoil the magnetic coating of the turntable.

The clearance between the magnetic coating rim and the speed-detecting head is more than 0.3 mm.



Speed Adjustment

1. Set the SPEED switch to "45" position.
2. Adjust RV102 for specified waveform as shown on the oscilloscope.

100–200 μ s



Note: The waveform should appear to positive side.

3. Set the SPEED switch to "33" position.

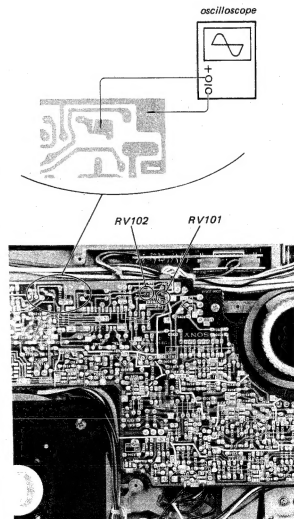
4. Adjust RV101 for specified waveform as shown on the oscilloscope.

450 – 550 μ s



Note: The waveform should appear to positive side.

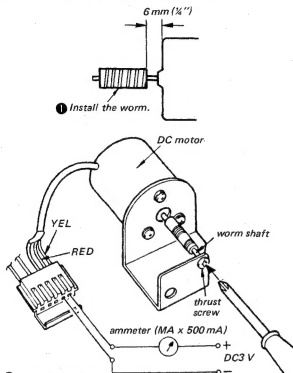
Adjustment Location



SECTION 3 ADJUSTMENTS

3-1. MECHANICAL ADJUSTMENT

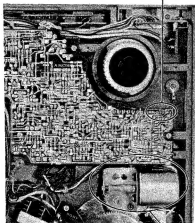
DC Motor Worm Thrust Play Adjustment



2 Adjust the thrust screw.

1. Connect an ammeter as shown.
2. Be sure not to touch the worm shaft and the thrust screw while rotating the motor.
3. Gradually turn the thrust screw clockwise to the position where the motor current suddenly increases.
4. Then, turn the thrust screw counterclockwise about 1/4 turn from the position obtained in step 3.

3 Remove the connector.



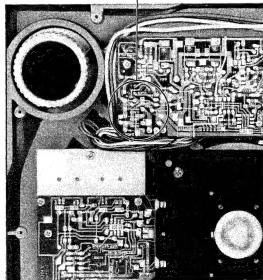
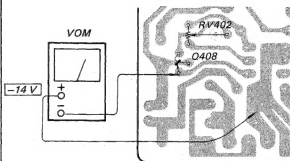
DC motor

3-2. ELECTRICAL ADJUSTMENTS

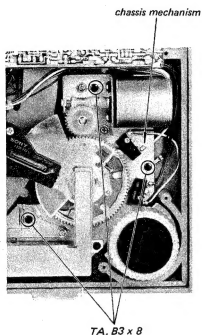
B— Voltage Adjustment

Adjust RV402 for -14 V dc reading on VOM.

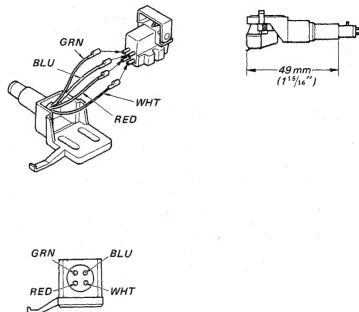
Adjustment Location and Specification
— Servo amp board —



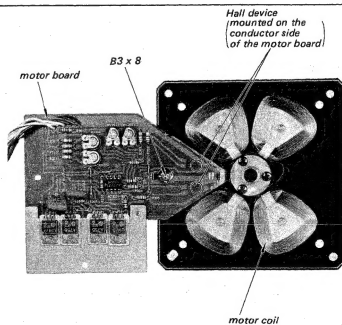
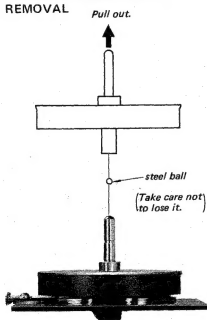
CHASSIS MECHANISM REMOVAL



CARTRIDGE INSTALLATION

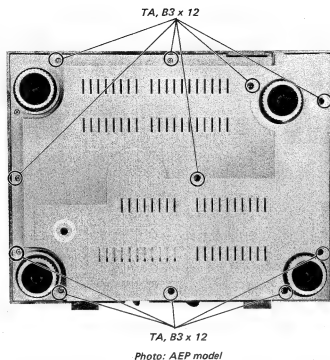


MOTOR REMOVAL

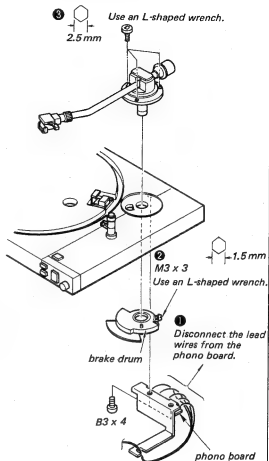


Note: Follow the disassembly procedure in the numerical order given.

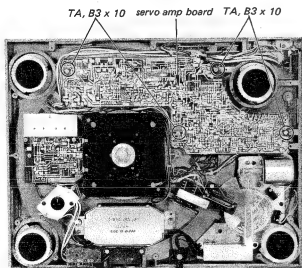
BOTTOM PLATE REMOVAL



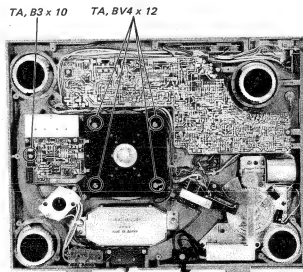
TONEARM REMOVAL



SERVO AMP BOARD REMOVAL



MOTOR SECTION REMOVAL



Automatic Return Adjustment

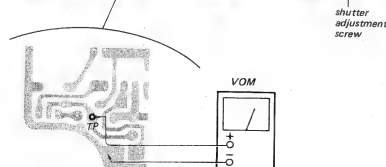
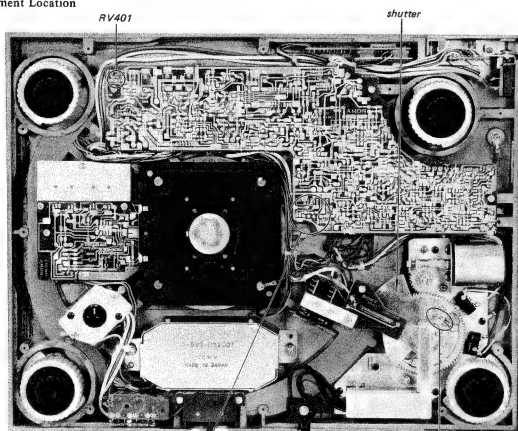
1. Turn the power switch on.
2. Bring the tonearm toward the center spindle.
3. Adjust RV401 for 2.5 V dc reading on the VOM.
4. Play the test record (YFSB-6, BAND 2,33 rpm).
5. Turn the shutter adjustment screw so that tonearm starts to return at count of 15-17.

Tuning direction	Count of return-point
clockwise	up
counterclockwise	down

6. Play the test record (YFSB-6, BAND3-6, 33 rpm)
7. Make sure that the tonearm starts to return when only 1 kHz playback signal is heard. If necessary, adjust RV401.

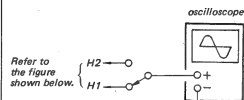
Tuning direction	Return-point
clockwise	sooner
counterclockwise	later

Adjustment Location

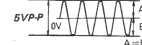


Hall Device Gain Adjustment (33 rpm)

1. Disconnect the white lead wire and connect the regulated power supply as shown below.
2. Connect an oscilloscope to H1 and adjust RV201 for the specified waveform on the oscilloscope.
3. Connect an oscilloscope to H2 and adjust RV202 for the specified waveform on the oscilloscope.

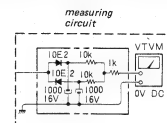


Note: Set the sweep time longer for easy checking the waveform.

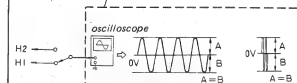


Motor Amp Offset Adjustment (33 rpm)

1. Disconnect the white lead wire and connect the regulated power supply as shown below.
2. Connect VTVM or oscilloscope to H1 and adjust RV204 for 0 V dc VTVM reading or the waveform on oscilloscope as shown below.
3. Connect VTVM or oscilloscope to H2 and adjust RV203 for 0 V dc VTVM reading or the waveform on oscilloscope as shown below.

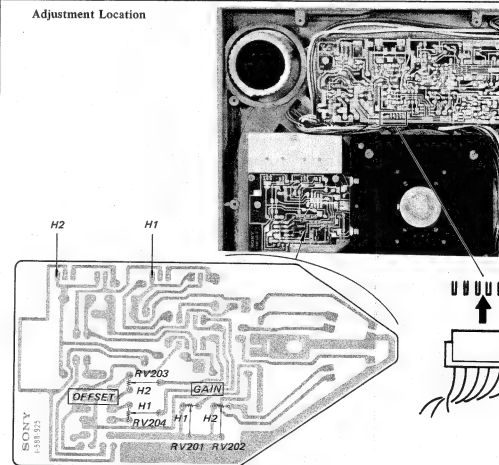


or

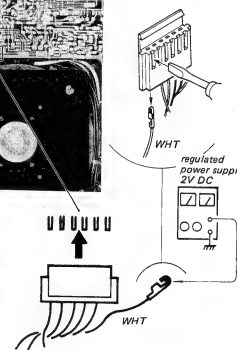


Note: Set the sweep time longer for easy checking the waveform.

Adjustment Location



White Lead Wire Removal

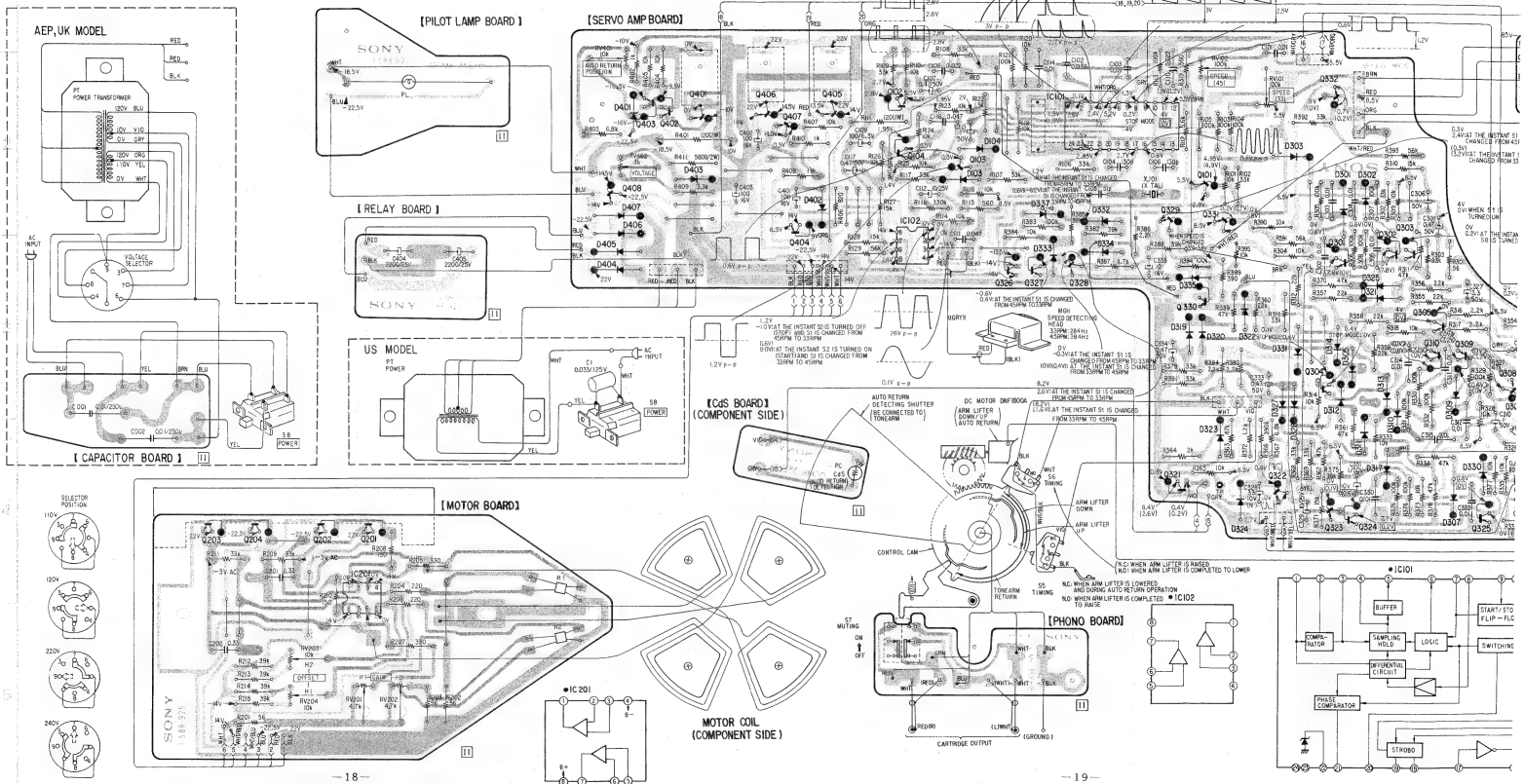


— 17 —

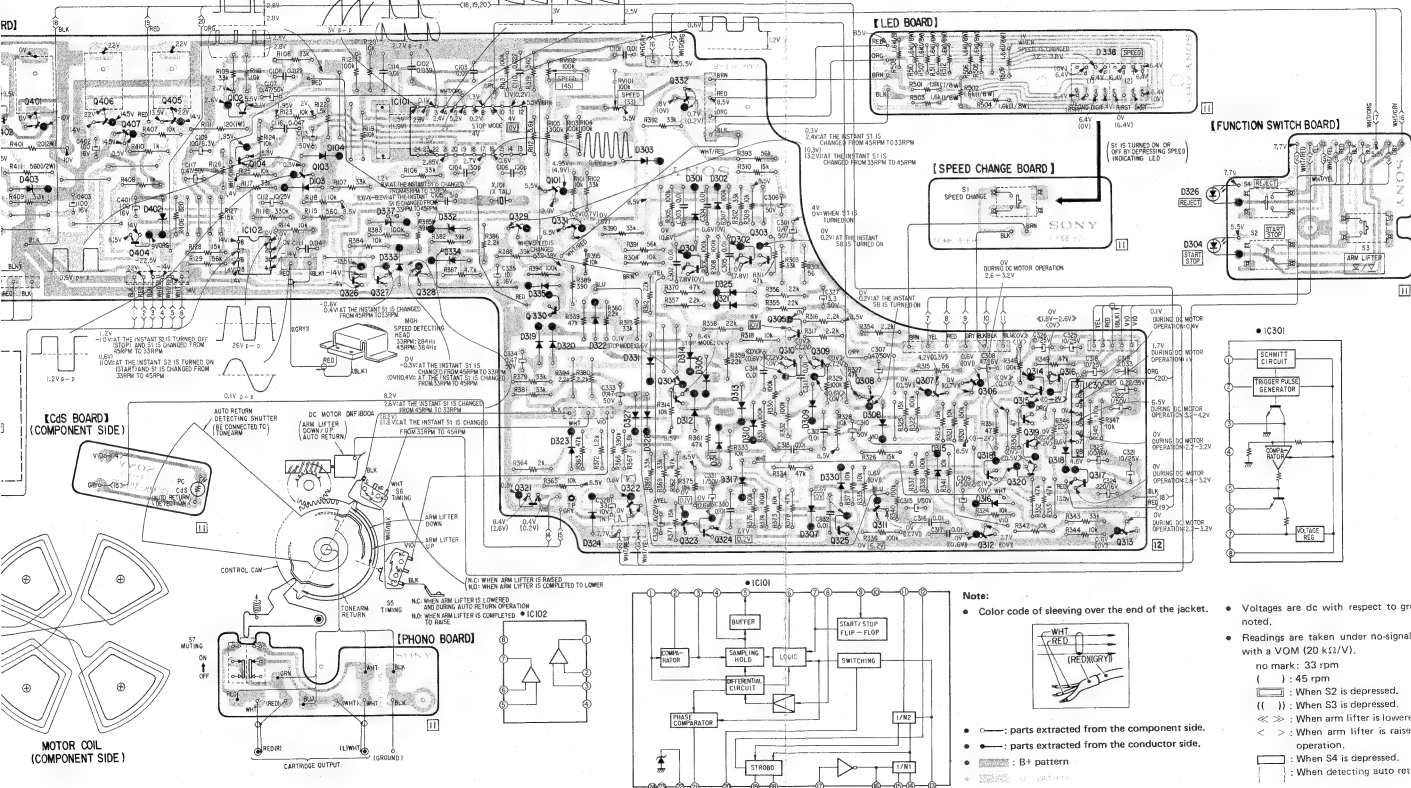
[illegible]

SECTION 4

DIAGRAMS

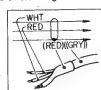
[illegible]

32	401	406	407	405	102	103			IC101	329	330	331		332	304	301	302,303	305	309	308		307	306	315	314	316	IC301	0
		404			104	IC102		326	327	328													318	319	320	317		IC
											321			322	323	324		325	311									
				402			104		337	332	335	330	331	303	301	302,325	313	309		308								
403					103			333	334		319,320	323	324	327,328	312	311	317	310	307	330		315		316		318		0



Note:

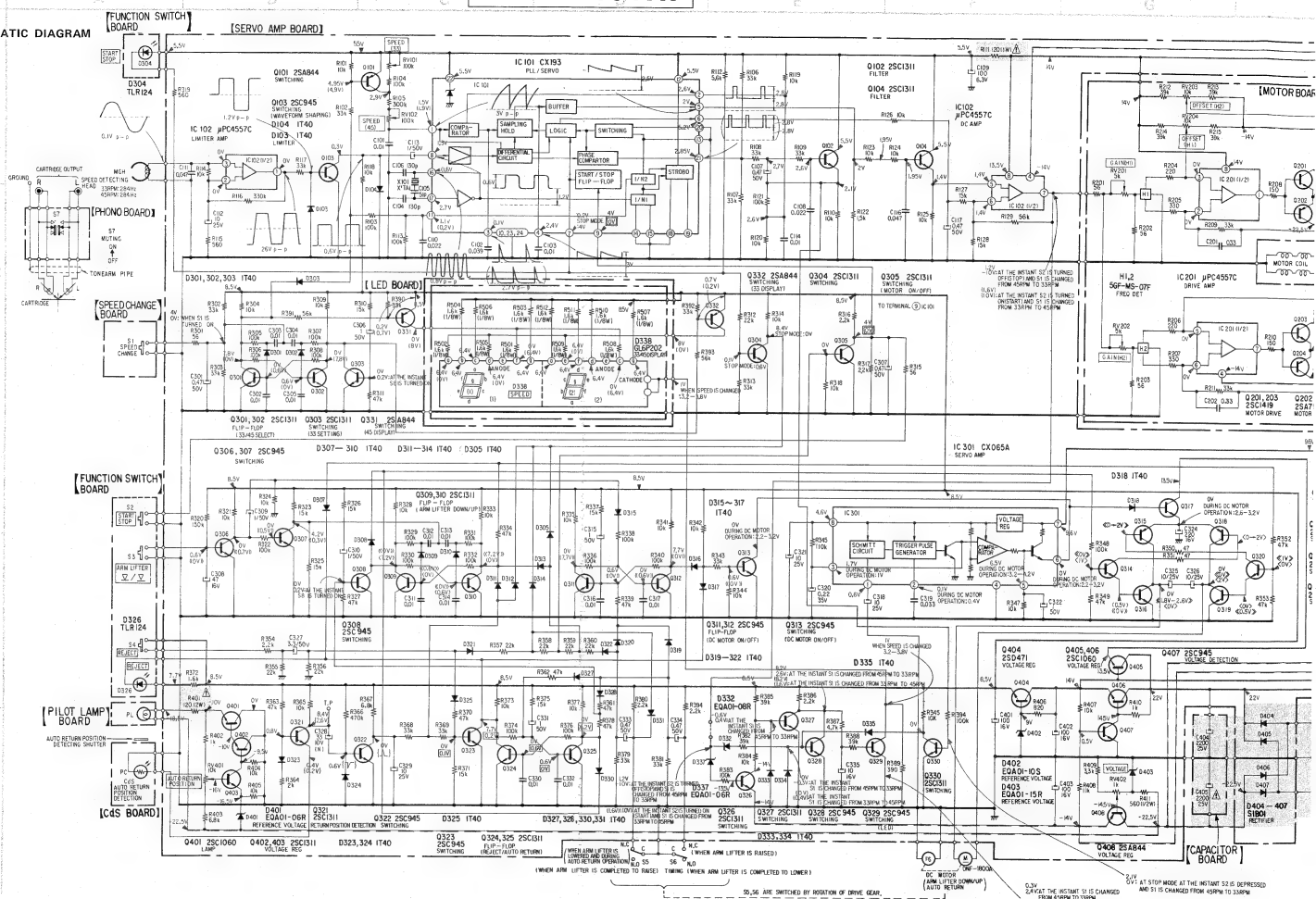
- Color code of sleeving over the end of the jacket.



- parts extracted from the component side.
- parts extracted from the conductor side.
- B+ pattern
- parts

- Voltages are dc with respect to ground unless otherwise noted.
- Readings are taken under no-signal conditions with a VOM (20 k Ω /V).
- no mark: 33 rpm
- () : 45 rpm
- () : When S2 is depressed.
- () : When S3 is depressed.
- < > : When arm lifter is lowered.
- < > : When arm lifter is raised and during auto return operation.
- () : When S4 is depressed.
- () : When detecting auto return position.

4-2. SCHEMATIC DIAGRAM



Replacement Semiconductors

For replacement, use semiconductors except in ().

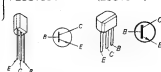
Q101, 331, 332, 408: 2SA1027R (2SA844)



Q102, 104, 301-305,
Q309, 310, 314, 320,
Q321, 324-327, 402,
Q403, 330

: 2SC1364

(2SC1311)



IC102, 201: μ PC4557C



IC301: CX065A



Q103, 306-308, 311-313,
Q322, 323, 328, 329, 407

: 2SC1364 (2SC945)



H1, 2: 5GF-MS-07F



Q201, 203: 2SC1061 (2SC1419)

Q317: 2SC1061

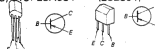


Q202, 204: 2SA671 (2SA755)

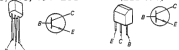


Q315, 318: 2SA684

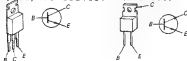
(2SB564)



Q316, 319, 404: 2SC1474 (2SD471)



Q401, 405, 406: 2SC1061 (2SC1060)



D332: EOB01-08 (EQA01-08R)
D337: EOB01-06 (EQA01-06R)
D401: EOB01-10 (EQA01-10S)
D405: EOB01-15 (EQA01-15R)



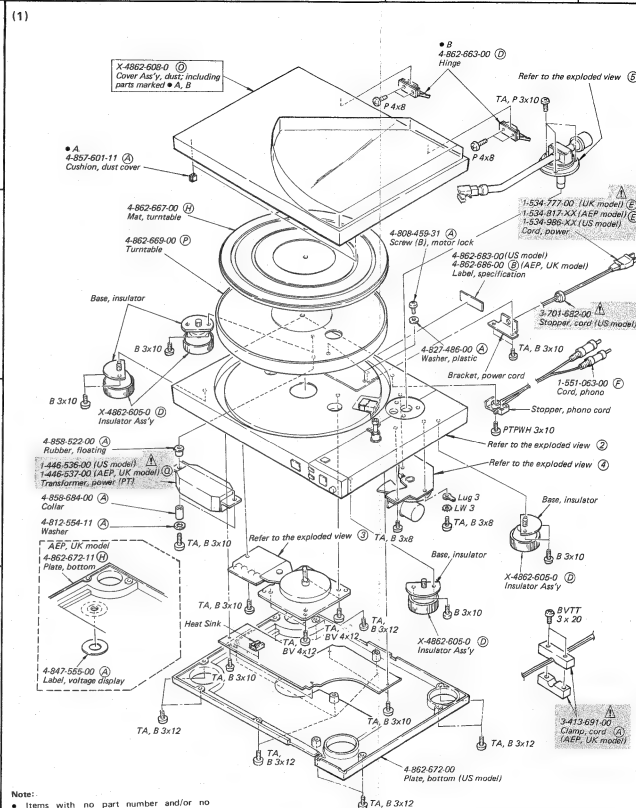
D338: GL6P202



D404-407: 10E2 (SIB01-02)



SECTION 5 EXPLODED VIEWS



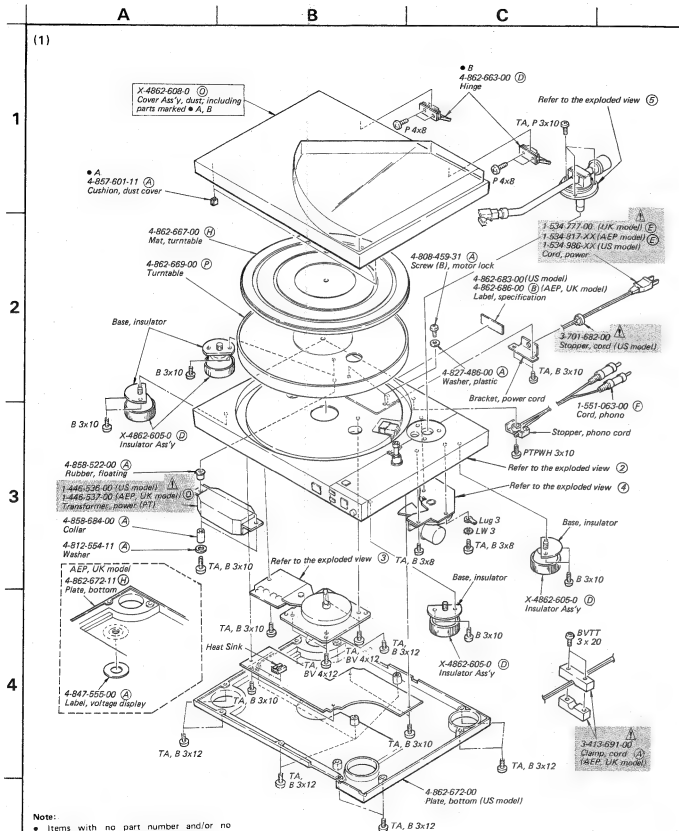
Note:

- Items with no part number and/or no description are not stocked because they are seldom required for routine service.
- All screws are Phillips (cross recess) type unless otherwise noted.
- (-) = slotted head
- Curved letters (A) to (Z) are applicable to European models only.

Note: The components identified by shading and mark Δ are critical for safety. Replace only with part number specified.

SECTION 5

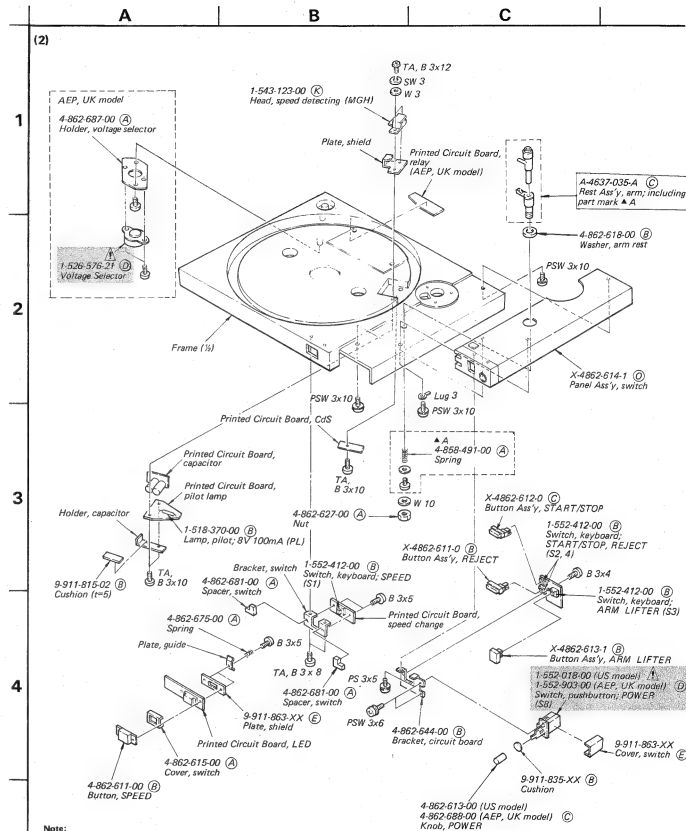
EXPLODED VIEWS



Note:


- Items with no part number and/or no description are not stocked because they are seldom required for routine service.
- All screws are Phillips (cross recess) type unless otherwise noted.
(-) = slotted head
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Note: The components identified by shading and mark are critical for safety. Replace only with part number specified.

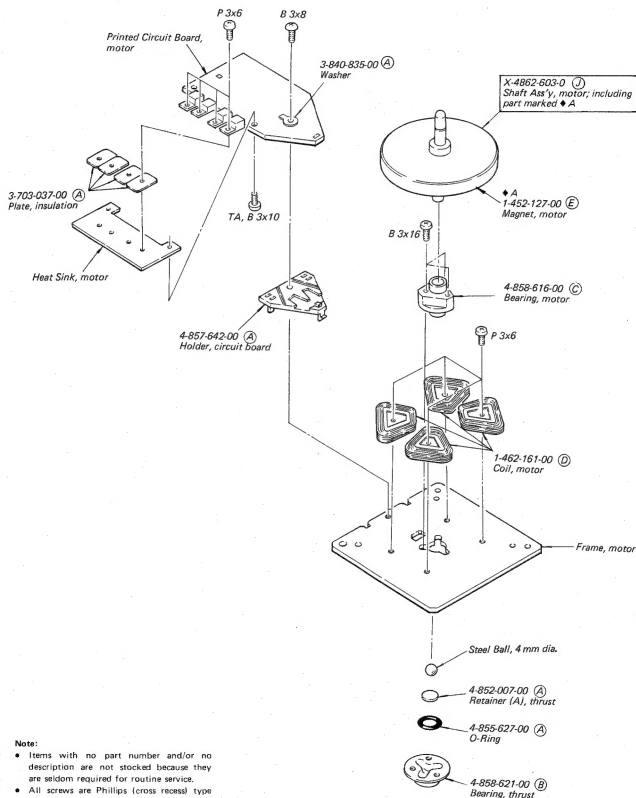


Note:

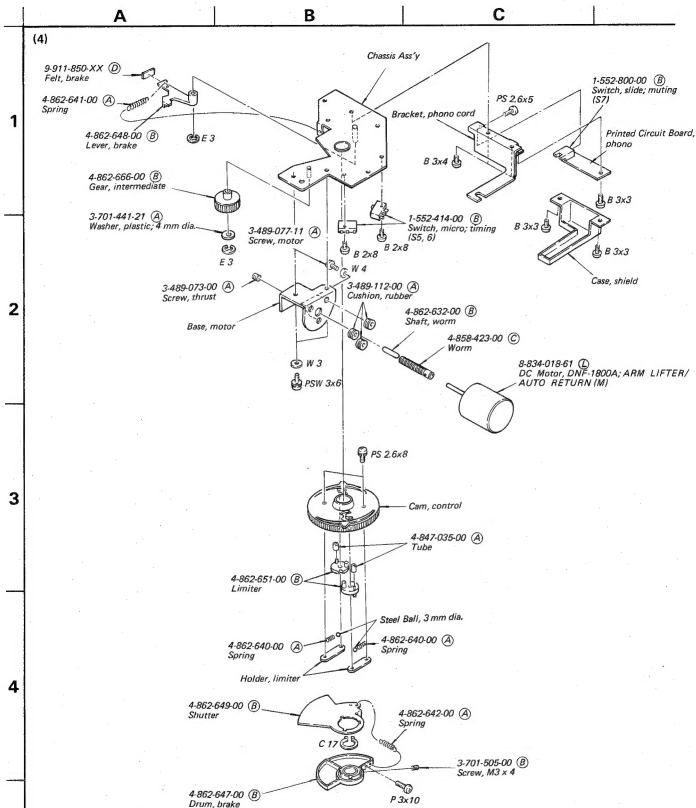
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- All screws are Phillips (cross recess) type unless otherwise noted.
(-) = slotted head
- Circled letters (A) to (Z) are applicable to European models only.

Note: The components identified by shading and mark  are critical for safety. Replace only with part number specified.

(3)

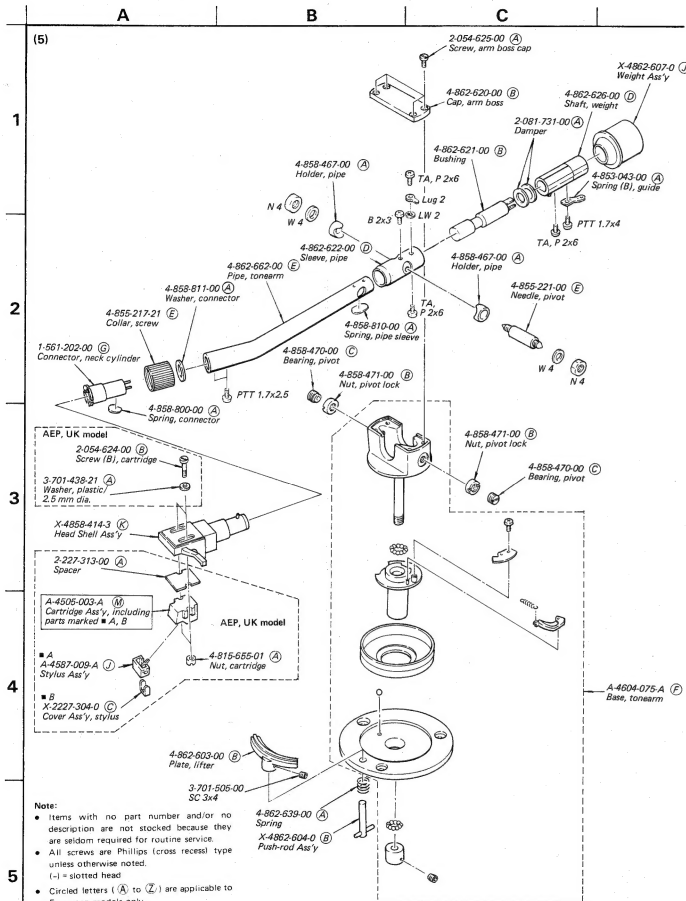

Note:

- Items with no part number and/or no description are not stocked because they are seldom required for routine service.
- All screws are Phillips (cross recess) type unless otherwise noted.
(-) = slotted head
- Circled letters (A) to (Z) are applicable to European models only.


Note:

- Items with no part number and/or no description are not stocked because they are seldom required for routine service.
- All screws are Phillips (cross recess type unless otherwise noted). (-) = slotted head
- Circled letters (A) to (Z) are applicable to European models only.

SECTION 6

ELECTRICAL PARTS LIST **Note:** Circled letters (A) to (Z) are applicable to European models only.

Ref. No. Part No. Description

SEMICONDUCTORS

Transistors

⇒ Q101	8-729-612-77	(B) 2SA1027R
⇒ Q102	8-729-663-47	(B) 2SC1364
⇒ Q103	8-729-663-47	(B) 2SC1364
⇒ Q104	8-729-663-47	(B) 2SC1364
⇒ Q201	8-729-316-12	(B) 2SC1061
⇒ Q202	8-729-317-12	(B) 2SA671
⇒ Q203	8-729-316-12	(B) 2SC1061
⇒ Q204	8-729-317-12	(B) 2SA671

⇒ Q301-305	8-729-663-47	(B) 2SC1364
⇒ Q306-308	8-729-663-47	(B) 2SC1364
⇒ Q309, 310	8-729-663-47	(B) 2SC1364
⇒ Q311-313	8-729-663-47	(B) 2SC1364
⇒ Q314	8-729-663-47	(B) 2SC1364

⇒ Q315	8-729-468-43	(B) 2SA684
⇒ Q316	8-760-335-10	(B) 2SC1474
Q317	8-729-316-12	(B) 2SC1061
⇒ Q318	8-729-468-43	(B) 2SA684
⇒ Q319	8-760-335-10	(B) 2SC1474

⇒ Q320, 321	8-729-663-47	(B) 2SC1364
⇒ Q322, 323	8-729-663-47	(B) 2SC1364
⇒ Q324-327	8-729-663-47	(B) 2SC1364
⇒ Q328-330	8-729-663-47	(B) 2SC1364
⇒ Q331, 332	8-729-612-77	(B) 2SA1027R

⇒ Q401	8-729-316-12	(B) 2SC1061
⇒ Q402, 403	8-729-663-47	(B) 2SC1364
⇒ Q404	8-760-335-10	(B) 2SC1474
⇒ Q405, 406	8-729-316-12	(B) 2SC1061
⇒ Q407	8-729-663-47	(B) 2SC1364
⇒ Q408	8-729-612-77	(B) 2SA1027R

ICs

IC101	8-751-930-00	(K) CX193
IC102, 201	8-759-145-57	(D) µPC4557C
IC301	8-759-600-65	(D) CX065A

Diodes

⇒ D103, 104	8-719-815-55	(B) 1S1555
D301-303		
D304	8-719-812-41	(B) TLR124
⇒ D305	8-719-815-55	(B) 1S1555
D307-325		
D326	8-719-812-41	(B) TLR124
⇒ D327, 328	8-719-815-55	(B) 1S1555
D330, 331		

⇒ Due to standardization, interchangeable replacements may be substituted for parts specified in the diagrams.

Ref. No. Part No. Description

⇒ D332	8-719-931-08	(B) EQB01-08
⇒ D333-335	8-719-815-55	(B) 1S1555
⇒ D337	8-719-931-06	(B) EQB01-06
D338	8-719-962-02	(J) GL6P202

⇒ D401	8-719-931-06	(B) EQB01-06
⇒ D402	8-719-931-10	(B) EQB01-10
⇒ D403	8-719-931-15	(B) EQB01-15
⇒ D404-407	8-719-200-02	(B) 10E2

Hall Elements

H1, 2	8-719-905-07	(D) 5GF-MS-07F
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CAPACITORS

All capacitors are in µF and ceramic unless otherwise noted. 50WV or less are not indicated except for electrolytics and tantalum. P: µF, elect. electrolytic

C001, 002	A1-130-196-00	(D) 0.01	250 V	film	(AEP, UK model)
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C1	A1-108-750-00	(D) 0.033	125 V	mylar	(US model)
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C101	1-108-579-00	(B) 0.01		mylar	
C102	1-108-360-00	(B) 0.039		mylar	
C103	1-108-579-00	(B) 0.01		mylar	
C104	1-101-081-00	(A) 130p			
C105	1-102-491-00	(A) 51p			
C106	1-101-081-00	(A) 130p			
C107	1-123-351-00	(B) 0.47	50 V	elect	
C108	1-108-587-00	(B) 0.022		mylar	
C109	1-123-295-00	(B) 100	6.3 V	elect	

C110	1-161-494-00	(A) 0.022			
C111	1-101-006-00	(A) 0.047			
C112	1-123-329-00	(B) 10	25 V	elect	
C113	1-123-352-00	(B) 1	50 V	elect	(semiconductor)
C114	1-161-051-00	(A) 0.1			

C116	1-108-595-00	(B) 0.047		mylar	
C117	1-123-351-00	(B) 0.47	50 V	elect	
C201, 202	1-108-855-00	(B) 0.33		mylar	

C301	1-123-351-00	(B) 0.47	50 V	elect	(semiconductor)
C302-305	1-161-051-00	(A) 0.01			
C306	1-123-352-00	(B) 1	50 V	elect	
C307	1-123-351-00	(B) 0.47	50 V	elect	
C308	1-123-319-00	(B) 47	16 V	elect	

C309, 310	1-123-352-00	(B) 1	50 V	elect	(semiconductor)
C311-314	1-161-051-00	(A) 0.1			
C315	1-123-352-00	(B) 1	50 V	elect	
C316, 317	1-161-051-00	(A) 0.1		(semiconductor)	
C318	1-123-329-00	(B) 10	25 V	elect	

Note: The components identified by shading and mark A are critical for safety. Replace only with part number specified.

